
# *Software Quality Engineering*

*Assignment 01*

Name : Muhammad Shamoil
Section : BSSE – V – A
Date: 18th October , 2025
Submitted To : Sir Naseer Jan

# Question 01

***Q1. What is your job experience (role, designation, responsibilities)? What projects have you undertaken/worked on so far? What has been your experience of encountering software quality issues and dealing with its improvement?***

I am a Software Engineering student currently gaining hands-on experience through academic and personal projects. My role mainly involves designing, developing, and testing software systems while focusing on writing clean and efficient code.

Some of the projects I have worked on include a Decentralized File Explorer using C++ and SFML, an IPFS-based File Management System, and a WhatsApp-like Chat Application using Python Sockets. I have also worked on data analysis projects involving dataset preprocessing, statistical calculations, and report generation in Python.

While working on these projects, I have encountered several software quality issues such as logical errors, inconsistent outputs, poor performance, and integration bugs. To deal with these, I followed a structured approach — debugging, modular testing, improving code readability, and optimizing algorithms. Over time, this experience taught me the importance of testing, version control, and maintaining coding standards to ensure overall software quality.

# Question 02

***What is software quality?***

Software quality refers to how well a software product meets the specified requirements, user expectations, and performance standards. It ensures the software is reliable, maintainable, efficient, and free from defects.

# Question 03

***How do you define software quality in software development?***

In software development, software quality means building software that functions correctly, is easy to use, performs efficiently, and can be maintained or updated without major issues. It focuses on meeting both functional and non-functional requirements throughout the development process.

# Question 04

***What does software quality in software product and software process mean to you?***

To me, software quality in a product means delivering a system that performs its intended functions accurately and satisfies user needs.
In a process, it means following proper development standards, testing methods, and quality practices to ensure that the final product is consistent, reliable, and defect-free.

# Question 05

***What are the benefits and shortcomings of Software Quality?***

**Benefits:**

- Increases user satisfaction
- Reduces maintenance cost
- Improves system reliability and performance
- Enhances product reputation and trust

**Shortcomings:**

- Increases development time and cost
- Requires skilled personnel and proper tools
- Continuous testing and documentation can slow down progress

# Question 06

***Define the following terms and give some concrete examples: error, fault, failure, accidents, defects and bugs. How do you relate all these terms?***

- **Error:** A human mistake during software development.
  *Example:* A developer writes the wrong formula in the code.
- **Fault (or Defect):** A flaw in the software caused by an error.
  *Example:* Wrong formula causes incorrect calculation results.
- **Failure:** When the software behaves unexpectedly during execution.
  *Example:* Program crashes when given specific input.
- **Accident:** An unintended and harmful outcome due to one or more failures.
  *Example:* A medical device software malfunction causing wrong dosage.

- **Bug:** A commonly used term for a fault or defect in software.
  *Example:* A missing semicolon causing compilation error.

**Relation:**
Errors made by humans create faults (defects) in code, which can lead to failures during execution. Repeated or critical failures can cause accidents. Bugs are the general term used for these faults or defects.

# Question 07

***What do the following terms mean to you: software quality, software quality engineering, software quality assurance, and software testing? What is the relationship among these terms?***

**Software Quality:** The overall degree to which a software meets its requirements and user expectations.

**Software Quality Engineering (SQE):** The discipline that applies engineering principles to design, develop, and manage software quality throughout the lifecycle.

**Software Quality Assurance (SQA):** The set of activities ensuring that the processes used to develop and maintain software meet quality standards.

**Software Testing:** The process of executing software to find defects and verify that it works as expected.

**Relationship:**
Software quality is the goal.

**Conclusion:**
Software quality engineering provides the methods to achieve it.
Software quality assurance ensures the process maintains it.
Software testing verifies it in the final product.